Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C.

In the Matter of	)	
	)	
Revision of the Commission's Rules	)	CC Docket No. 94-102
To Ensure Compatibility With Enhanced	)	RM-8143
Emergency Calling Systems	)	

To: Chief, Wireless Telecommunications Bureau

PETITION FOR WAIVER

Pursuant to Section 1.3 of the Commission's Rules, 47 C.F.R. § 1.3, and the Wireless Telecommunications Bureau's November 13, 1998 "Order," in the above-captioned proceeding, DA 98-2323 (the "November 13 Order"), American Cellular Corporation and its subsidiaries listed on Attachment A hereto (collectively, "ACC") hereby requests waiver of Section 20.18(c) of the Commission's Rules, 47 C.F.R. § 20.18(c), in connection with the transmission of 911 calls made from TTY devices using digital wireless systems.[1] In support whereof, the following is shown.

A. Background

The Commission's December 13, 1997 "Memorandum Opinion and Order" in this proceeding suspended enforcement of Section 20.18(c) until October 1, 1998.[2] The Wireless Telecommunications Bureau subsequently extended the compliance date to November 15, 1998[3]

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[1] ACC, through the subsidiaries listed on Attachment A, holds cellular telephone licenses in 30 markets and PCS licenses in three markets.

[2] See Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems, 12 FCC Rcd. 22665 (1997).

[3] See Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911
(footnote continued on next page)

and in the November 13 Order, the Bureau further extended the deadline to January 1, 1999.[4] In the November 13 Order, the Bureau also established procedures and provided guidance for carriers who seek waiver of the Section 20.18(c) requirements beyond January 1, 1999. ACC files the instant Petition for Waiver pursuant to those procedures.[5]

After reviewing its ability to meet the December 31, 1998 deadline for allowing the transmission of 911 calls made from TTY devices using digital wireless systems, ACC has determined that it must request a waiver due to the unavailability of equipment that would enable ACC to comply with Section 20.18(c) of the Rules.

The Commission has long been aware that TTY compatibility over digital networks would be extremely difficult to achieve. Even in the "First Report and Order" adopting Section 20.18(c) of the Rules, the Commission recognized the considerable technical obstacles that existed to TTY digital wireless access, explaining the "coordination among many parties" that would be a precondition to such access, as well as need for a "common data standard under which wireless and wireline providers can deliver TTY data to the PSAP."[6] The issues that have delayed implementation of TTY over digital networks not only were anticipated by the Commission but were also brought to the Commission's attention by participants to that

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Emergency Calling Systems, DA 98-1982 (Wireless Telecommunications Bur., released September 30, 1998) (the "September 30 Order").

[4] See November 13 Order.

[5] Although the November 13 Order directed carriers seeking such waivers to file their requests by December 4, 1998, ACC was unable to comply with that deadline. Accordingly, ACC respectfully requests that the Commission accept the instant petition nunc pro tunc.

[6] Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems, 11 FCC Rcd. 18676, 18700-01 (1996). See also "Reconsideration Order," 12 FCC Rcd. 22665, 22695 (1997).

proceeding.[7] Accordingly, the numerous waiver petitions that wireless carriers have filed in this proceeding should come as no surprise to the Commission.

As soon as compliance with this rule is technically feasible, ACC intends to adopt and implement industry standards developed that will facilitate the ability of persons with speech and hearing disabilities to make full use of the 911 system over digital wireless facilities. However, the nature of this issue -- i.e., one that affects all digital wireless communications operators as well as the manufacturers that provide equipment to those operators -- is such that ACC alone is unable to implement TTY/digital wireless E911 without the cooperation and efforts of all industry players. In that regard, ACC supports the efforts being conducted by parties throughout the wireless telecommunications industry -- and specifically those of the Wireless TTY Forum -- in establishing a specific Workplan toward the development of voice-based and data-based solutions to the problems associated with successfully transmitting TTY calls over digital wireless systems.

As of this time, however, no equipment is available that will enable ACC to achieve the result required by Section 20.18(c). Absent the development, testing, and commercial availability of such equipment, ACC is unable to comply with this rule. ACC therefore requests waiver of Section 20.18(c) until such time as its vendors can develop the equipment needed to allow its compliance. If the Commission grants ACC this waiver, ACC will file a progress report every three (3) months to keep the Commission apprised of ACC's progress toward implementing full TTY/digital capability.

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[7] See e.g., "Petition for Reconsideration," Telecommunications Industry Association, filed September 3, 1996.

B. Waiver Showing Under November 13 Order

1. Efforts to Afford TTY Users Capability to Use Devices with Digital Systems. As an initial matter, ACC intends to provide notice to its customers that: (1) TTY devices cannot be used over ACC's digital facilities and (2) ACC will notify its customers as soon as such access is available. In the meantime and until such access is fully available, ACC will ensure that its customers using TTY devices have alternatives, such as access to analog facilities, that will ensure their ability to access the E911 network when needed.

As discussed above, ACC supports the efforts of numerous organizations that are working to develop industry-wide TTY solutions. These efforts have involved equipment suppliers to the wireless industry, trade associations such as CTIA that represent the interests of ACC and others in the wireless in the wireless communications industry, and numerous industry technology groups. The work of these organizations is critical to ACC's ability to comply with Section 20.18(c), since ACC's compliance is dependent on the availability of equipment and software from its vendors.

Moreover, ACC has contacted each of its four major equipment and software vendors – Motorola, Erikson, Nortel, and Glenayre -- to assess the availability of technical solutions that will enable full TTY access to ACC's digital cellular systems. These vendors have confirmed that no equipment is currently available that would permit ACC's compliance with Section 20.18(c) and have committed to working with industry groups such as the TTY Forum to devise solutions that will permit full TTY access to ACC's digital wireless E911 facilities.

2. Timetable for Affording Access to TTY Users. ACC intends to obtain the necessary equipment and upgrade its facilities as soon as reasonably possible after such equipment is available. However, ACC is dependent on the progress made by the industry

groups in general, and by ACC's equipment vendors in particular, for a precise timetable as to when a solution to the TTY/E911 problem will be available. ACC continues to work with its vendors to obtain this information and, if granted the requested waiver, will provide the Commission with periodic updates as to when equipment is expected to become available and a precise date when compliance will be achieved.

In the meantime, ACC has relied on the Wireless TTY Forum Workplan, a copy of which is provided as Attachment B hereto, which contains a schedule of milestones for developing and implementing technical solutions that will afford TTY users with the access to the 911 network through digital wireless systems. ACC expects that after the wireless industry groups adopt standards for digital TTY operation, the equipment needed to implement those standards will not be commercially available to ACC until at least 12 to 18 months after that date. ACC intends to act as promptly as possible after that time to add the necessary equipment to its network, and to offer any necessary equipment to consumers, that will allow full compliance with Section 20.18(c) of the Rules.

3. Efforts to Address Consumer Concerns. As an initial matter, ACC notes that while it endeavors always to respond to consumer needs and concerns, including those concerns listed in Appendix A of the September 30 Order, the Commission has not imposed those requirements on wireless operators as Rules or technical standards. Since these concerns are not formal requirements of the Commission's Rules, the Bureau lacks the authority to require wireless system operators to comply with each issue raised in this list.

Nonetheless, ACC intends to offer to consumers, to the maximum extent possible consistent with industry standards, TTY/E911 connections that comply with the concerns identified in Appendix A of the September 30 Order. As discussed in the TTY Forum Workplan,

various voice-based and data-based solutions address the consumer concerns to varying degrees. It appears that the proposals which may work for ACC's network which address most of the consumer concerns, but additional testing remains needed to confirm the extent to which each such concern is addressed. ACC recognizes the value of offering TTY/E911 access as part of its digital wireless service, as required by the Commission's Rules, and will endeavor to fully implement TTY/E911 access not only to further public health and safety, but also as part of its efforts to serve customers' needs.

C. Waiver Request

ACC hereby requests a waiver of Section 20.18(c). The unique circumstances surrounding the transmission of 911 calls using TTY devices on ACC's digital wireless systems warrants the special consideration requested herein. It is technically infeasible for ACC to comply with the FCC's requirements concerning TTY/E911 digital transmissions. Accordingly, requiring compliance is not in the public interest nor in the best interests of ACC's customers.

Grant of the instant waiver request also serves the public interest because the circumstances preventing ACC's compliance with the implementation deadline are beyond ACC's control. Furthermore, such circumstances are industry wide and are not uniquely attributable to ACC's circumstances or efforts in this matter.

Moreover, enforcement of Section 20.18(c) requirements against ACC would threaten the ongoing viability of its wireless services, most of which are offered in rural areas of the United States. ACC endeavors to offer the best service possible to its subscribers, some of whom would not otherwise receive wireless service in the remote areas where they reside. The FCC has recognized the importance of encouraging the spread of telecommunications services to rural

areas.[8] The waiver requested herein of the Section 20.18(c) obligation to offer TTY/E911 transmissions, will allow ACC to continue to provide the high quality of service that it presently offers to its customers until such time as compliance is possible.

D. Conclusion

For the foregoing reasons, ACC request a waiver of the January 1, 1999 commencement date for transmission of 911 calls made from TTY devices using digital wireless systems. ACC's showing herein is consistent with the requirements for waiver set forth in the Commission's November 13 Order. Moreover, the public interest benefit of granting waiver equals or exceeds that which the Commission has found in other instances to be sufficient for waiver.

[8] See e.g., Federal-State Joint Board on Universal Service, 12 FCC Rcd 8776, 8799-8806 (1997).

WHEREFORE, American Cellular Corporation, and its subsidiaries listed on Attachment A hereto, respectfully request that the Commission WAIVE the requirements of Section 20.18(c) as requested herein.

Respectfully submitted,

AMERICAN CELLULAR CORPORATION and
its Subsidiaries listed on Attachment A hereto

By: _____
Lawrence Roberts
James S. Blitz

Davis Wright Tremaine LLP
1155 Connecticut Avenue, N.W., Suite 700
Washington, D.C. 20036
(202) 508-6605

Its Counsel

December 28, 1998

DECLARATION OF STEPHEN EASLEY

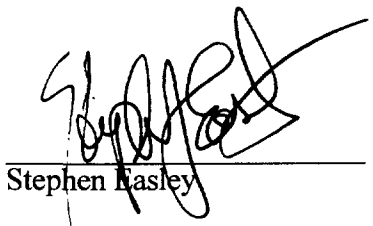
I, Stephen Easley, hereby state as follows:

1. I am Vice President General Counsel of American Cellular Corporation.

2. I have reviewed the foregoing "Petition for Waiver" and the statements contained therein are true, complete and correct to the best of my knowledge and belief.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on this 28th day of December, 1998.



Stephen Easley

ATTACHMENT A

Duluth/Superior Cellular, Inc.
One Cellular Corporation
Chippewa Cellular Corporation
Minnesota Six Cellular Corporation
Pebbles Cellular Corporation
Vilas Cellular Corporation
Bunyan Cellular Corporation
Wausau Cellular License Corporation
Alton CellTelCo
Gilro Cellular Corporation
Seven Cellular Corporation
Alexandra Cellular Corporation
Eastern Wireless Cellular Corporation
Amro Cellular Corporation
Dutchess County Cellular Telephone Company
Chill Cellular Corporation
Northland Cellular Corporation
Four Cellular Corporation
Five Cellular Corporation
Central Kentucky Cellular Corporation
Kyle Cellular Corporation
PCPCS Corporation

ATTACHMENT B

PROPOSED WORKPLAN OF TTY FORUM

WIRELESS TTY FORUM WORKPLAN: TTY ACCESS OVER DIGITAL WIRELESS SYSTEMS

Since September 1997, the wireless telecommunications industry (wireless carriers and phone manufacturers), manufacturers of TTY equipment, emergency and relay service provider (9-1-1 and TRS), and consumer organizations that represent individuals who are deaf and hard-of-hearing ("Stakeholders") have undertaken intensive collaborative efforts through the Wireless TTY Forum to develop technically feasible solutions for TTY users to access 9-1-1 over digital wireless systems. To date, the TTY Forum's primary focus has been voice-based solutions in an effort to find an acceptable short-term solution and to meet the FCC's compliance date. The TTY Forum has also proposed several data-based solutions for TTY access to digital wireless systems.

The wireless industry is committed to continuing intensive collaborative efforts to provide viable and practical solutions for TTY access over digital wireless systems not only for 9-1-1 purposes but also to meet the industry's obligations under Sections 225 and 255 of the Communications Act of 1934, as amended. The wireless industry acknowledges that it cannot resolve this issue in a technical vacuum, and that the wireless industry must continue to work cooperatively with TTY manufacturers, the appropriate consumer organizations and organizations representing public safety answering points ("PSAPs") to resolve this issue. Accordingly, the Wireless TTY Forum proposes the following Workplan with scheduled milestones for developing and implementing technical solutions for TTY users to access 9-1-1 over digital wireless systems.

Revised
11/6/98

PROPOSED WORKPLAN

I. Assessment of Test Results and Finalization of Test Plan

The TTY Forum has provided preliminary test results and demonstrations on several potential methods for addressing incompatibility between TTYs and the different wireless digital technologies. The TTY Forum developed a uniform test script that manufacturers representing various digital technologies and at least one TTY manufacturer have used in their testing. Test results, however, indicate a wide variance in the character error rate. Furthermore, trying to isolate the cause of the problem within a short time period has been a Herculean yet circumspect task with no conclusive results to date. While the goal is to minimize the character error rate, particularly in 9-1-1 situations, a certain character error rate is inherent with wireline and wireless, both analog and digital technology, and TTY devices.

The co-chairs of the TTY Forum have acknowledged the need for the development of a consistent test methodology, a uniform method of evaluating the test results ("test plan") and TTY performance standards to determine the minimal level of character error rate that TTY users can expect with certain digital technologies used with certain TTY devices.[1]

A. Independent review and assessment of tests conducted to date.

The TTY Forum has requested Dr. Dale Hatfield, Chief of the FCC's Office of Engineering and Technology ("OET") to review and assess the tests conducted to date. It is anticipated that Mr. Hatfield will provide guidance to the TTY Forum on the soundness of the research conducted to date and identify any discontinuity or gaps in such research that should be explored in the development of a standardized test procedure.

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[1] Since the September 1998 TTY Forum, the wireless industry has reviewed the initial test results and has concluded that additional testing would not yield new or significant information on character error rates. The wireless industry has acknowledged that there does not appear to be a voice-based solution in the near future which will allow the Baudot signal of a TTY device to pass through the vocoder of a digital air interface and achieve a character error rate comparable to the character error rate achieved with analog air interface, *i.e.*, less than 1%. Nevertheless, the wireless industry has agreed to conduct further testing to assess character error rates and in accordance with the standardized Test Procedure.

Target Date
Review and assess tests conducted to date -**Task Completed**

B. Finalization of a Standard Test Procedure

The TTY Forum with the assistance of the wireless digital technology groups[2] shall develop a uniform test process designed to limit and control test variables and establish a test methodology yielding better consistency in determining and comparing character error rates ("CER") across the various digital wireless technologies (CDMA, TDMA, GSM 1900, iDEN). Each wireless digital technology group has assumed responsibility for modifying the test process to accommodate testing variances of that technology.

- ◊ Draft Test Procedure – **Task Completed**
- ◊ Submit Test Process to Wireless Digital Technology Groups – **Task Completed**
- ◊ Responses due from wireless digital technology groups regarding modifications, locations of test facilities and test schedules – **10/28/98**
- ◊ Review responses from wireless digital technology groups (Test Plan Sub-task Group) – **10/28/98 – 10/29/98**
- ◊ Submit Test Procedure to FCC and distribute to wireless manufacturers and carriers – **10/30/98**
- ◊ Status Report to TTY Forum – **11/4/98**
- ◊ Review and Feedback on Test Procedures – **TBD by FCC**

C. Conduct additional tests using Test Procedures and compare new results

Each wireless digital technology group shall identify at least one test facility and advise the TTY Forum as to the availability of the test facility in order to commence testing prior to April 1999.[3] Wireless manufacturers and carriers will conduct tests in accordance with the test schedules submitted and return results to

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[2] For purposes of the Workplan, wireless digital technology groups refers to the CDMA Development Group ("CDG"), GSM North America, and Universal Wireless Communications Consortium ("UWC Consortium").

[3] GSM NA has indicated that it plans to commence testing as soon as possible with a target date of January 1999 to provide test results to the TTY Forum and the FCC, provided that the following are true: 1) the test specification with modifications suggested by the GSM NA is approved and released by October 30, 1998; 2) lab based testing with real world conditions is accepted; 3) the test specification does not change dramatically; 4) manufacturers can assist the test facilities to set up the test; and 5) no unforeseen restrictions are placed on the testing.

the TTY Forum and the FCC as soon as available. TTY Forum members shall concurrently continue to research acceptable error rates, voice-based and data-based solutions during the test schedule.

The TTY Forum will provide advance notice to all interested parties of the test dates, location of the test laboratories, and contact person. Technical representatives of TTY manufacturers, Gallaudet University, PSAPs and the FCC are encouraged to participate in the testing and should contact the appropriate manufacturer or carrier conducting the test to discuss participation.

Goals and Target Dates
Refer to Test Procedure for list and availability of test labs and scheduled target dates for conducting the additional tests.

D. Analysis of test results and recommendations

The TTY Forum will appoint a sub-group comprised of representatives from each of the Stakeholder groups. The sub-group will review and analyze the test results and provide specific comments and recommendations to the TTY Forum and the FCC based on the test results.

Goals and Target Date
January 1999

II. User Requirements

Consumer representatives of the TTY Forum have provided the TTY Forum with two documents outlining their criteria with respect to solutions: *Consumer Approved Criteria for Acceptance of 'One Phone Model Per Service Provider as of October 1' Proposal* ("Consumer Criteria Document") and *September 10, 1998 Memorandum from Consumer Representatives to TTY Forum ("September 1998 Consumer Memo").*

A. Consumer Criteria Document

The purpose of the document was to stimulate discussion and solicit the views of the wireless carriers and manufacturers participating in the TTY Forum. At the September 1998 TTY Forum Meeting, CTIA, on behalf of its members, submitted its comments to the criteria set forth in the Consumer Criteria Document.[4] CTIA's senior staff and the drafters of the Consumer

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[4] Letter from Andrea Williams, Assistant General Counsel, Cellular Telecommunications Industry Association, to Ed Hall and Mary Madigan, Co-

Criteria Document shall meet at a mutually agreeable time to address the criteria in the context of CTIA's inter-disciplinary approach to accessibility under Section 255.

Goals and Target Date
Meeting to be held on a mutually agreeable date but no later than December 15, 1998.

B. September 1998 Consumer Memo

On September 10, 1998, representatives of the consumer groups circulated a document to members of the TTY Forum outlining a new set of criteria to address only functional characteristics of any proposed solution for TTY access to digital wireless systems.[5] In accordance with the FCC's Extension Order, the TTY Forum shall consider whether the criteria set forth in the September 1998 Consumer Memo is supported in the proposed voice-based and data-based solutions set forth in this Workplan. Consideration of the criteria shall be documented in a matrix of proposed technical solutions.

Goals and Target Date

- ◊ Develop matrix of proposed technical solutions - **Task completed**
- ◊ Finalize matrix (Task Force Members) - **Task Completed**
- ◊ Submit matrix with Workplan to FCC - **10/30/98**
- ◊ Submit September 30th Consumer Memo to standards-setting organizations – **early December 1998**

III. Performance Standards for TTY Devices

Over the past several months, there has been significant discussion concerning the lack of uniform performance standards among TTY devices. Manufacturers of wireless handsets have indicated that such standards are critical in trying to address the technical challenges of

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Chairs, Wireless TTY Forum, Sept. 8, 1998. Attached to October Quarterly Status Report as Appendix Q.

[5] Memorandum from Consumer Representatives to TTY Forum, Sept. 10, 1998. Attached to October Quarterly Status Report as Appendix R.

The FCC's Wireless Telecommunications Bureau has elevated the new list of criteria by attaching it to the Extension Order as an appendix and holding it out as an example of what consumer groups would like to have incorporated into any solution implemented by the Forum, and therefore the workplan. See Extension Order at 4.

voice-based solutions, including passing the Baudot signal of a TTY device over a digital air interface without any modification to the handset or the TTY device. The TTY Forum also discussed the need for a list of "most often used" TTY devices and specifications for each device if TTY manufacturers are not using the EIA Draft Standard. [6] Two TTY manufacturers (Ultratec and Ameriphone) have agreed to identify the typical operating characteristics of the majority of existing TTYs and submit this information as a contribution to the TTY Forum. The TTY Forum will also compile a list of the TTY devices used in the tests. A letter will be sent to a third TTY manufacturer (Krown) again requesting their participation in the TTY Forum, specifically providing typical operating characteristics of its existing TTYs.

Goals and Target Dates

Discussion of TTY manufacturers' willingness to incorporate EIA Draft Standard - **TTY Forum - 9 (11/4/98-11/5/98)**
Submission of document listing typical operating characteristics of the majority of existing TTYs – **Week of 11/9/98**
Letter to third TTY manufacturer – **Week of 11/9/98**

IV. Proposed Technical Solutions

To provide TTY users with a variety of solutions and to allow manufacturers and service providers maximum flexibility to develop innovative technology and services for TTY users, the TTY Forum has posed several voice-based and data-based solutions. The TTY Forum presently does not support any one solution over others. The TTY Forum has developed a matrix of proposed voice-based and data-based solutions. The matrix sets forth the implementation stages, the advantages and disadvantages of each solution, whether the consumer requirements set forth in the September 1998 Consumer Memo are supported, and the corresponding milestones scheduled for each phase of implementation. Please refer to Appendix C: Solutions Matrix and WorkPlan for target dates where applicable.

A. Proposed Voice-Based Solutions

The TTY Forum defines voice-based solutions as those solutions whereby the Baudot signal passes through the Vocoder. Proposed voice-based solutions include connection method solutions such as:

- Direct Audio Connection
- RJ-11-type Modular Connection/Jack (Analog Solution)

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[6] See Electronic Industries Association, Memorandum to Parties Interested in EIA Standards Project PN 1663, Telecommunications Devices for the Deaf, May 16, 1988, 1. Attached to October Quarterly Status Report as Appendix J.

- True RJ-11 Connection
- Acoustic Solution
- Proprietary Solutions

Other proposed voice-based solutions include solutions that may require modification of the Vocoder.

Direct Audio Connection

It appears that coupling via a direct audio connection between the TTY device and a digital wireless handset, *i.e.*, a 2.5 mm audio interface, is a preferred voice-based solution for some wireless carriers. A proposal for a wireless phone 2.5mm audio interface to TTY devices has been submitted to the TTY Forum.[7] The proposal noted that audio output and input levels are different for each make and model phone. Thus, manufacturers of wireless phones would need to provide a special adapter with standard levels. Moreover, audio output and input levels of TTY devices have yet to be defined. The proposal recommended a "common interface" to resolve the variance in output and input levels.[8] While the TTY Forum has reviewed a draft Technical Information Document ("TID"), the TID will be finalized at TTY Forum-9 and will be distributed to manufacturers and carriers shortly thereafter. Members of the TTY Forum will also prepare a Standards Requirements Document ("SRD") for submission to TIA TR45 in early December 1998.

Acoustic Solution

Ericsson has indicated that it plans to pursue this option. Due to the confidential nature of Ericsson's marketing plans for this option, the TTY Forum recommends that the FCC meet with the manufacturer under confidentiality to discuss specific implementation plans and scheduled milestones.

RJ-11-type Modular Connection/Jack (Analog Solution)

The TTY Forum has discussed this option and does not consider it to be a viable short-term solution. Thus, the Forum has not pursued development or implementation of this option.

True RJ-11 Connection

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[7] See Proposed - Wireless Phone 2.5mm Audio Interface to TTY/TDD ("2.5mm Audio Interface Proposal"). Attached to October Quarterly Status Report as Appendix K.

[8] See 2.5mm Audio Interface Proposal at 3-4. Attached to October Quarterly Status Report as Appendix K.

The TTY Forum has discussed this option and does not consider it to be a viable short-term solution. Thus, the Forum has not pursued development or implementation of this option.

Proprietary Solutions

Several proprietary solutions such as the Mobility™ TTY, an enhanced TTY device developed by Lober & Walsh Engineering, the AxCell Interface Device developed by Sendele Wireless Communications and the RangeStar™ Technology developed by RangeStar International, have been presented to the TTY Forum for consideration as solutions. Due to the proprietary nature of these solutions, the TTY Forum has not been privy to how soon these products will be made commercially available. The TTY Forum recommends that that the FCC meets with each company separately and under confidentiality to discuss specific implementation plans and scheduled milestones.

B. Proposed Data-Based Solutions (Circuit-Switched)

The proposed data-based solutions include Inter-Working Function solutions, Third Party Gateway and Proprietary Data-based solutions. The TTY Forum has adopted a SRD for Circuit-Switched Data, which will be submitted to TR45 in early December 1998.

Inter-Working Function Solutions

These solutions rely on the development and installation of the appropriate inter-working function (IWF) software into a wireless carrier's network infrastructure. There are at least two proposed IWF solutions: the V.18 standard and proprietary TTY modems. While the standards for GSM, TDMA, iDEN and CDMA support the IWF functionality, minor modifications are necessary for TTY applications. Implementation of IWF solutions requires completion of product development and deployment, including billing capabilities for data, installation of TTY software in the subscriber terminal, installation of the IWF infrastructure which may be installed per switch or shared among a carrier's switches. In addition, V.18 capable modems need to be manufactured for use in the United States. The estimated timeframes set forth in the Matrix are contingent upon several factors: availability of modems incorporating V.18 standard or other enhanced protocols; timely resolution of any unanticipated technical glitches in product development and deployment as well as installation of the IWF infrastructure; and the availability of the appropriate engineering staff.

The TTY Forum will send a letter to IWF and modem manufacturers notifying them about the TTY Forum's work and the demonstrations of an IWF (V.18) as one type of viable data-based

solutions. The letter will also request information and the projected time period concerning the incorporation of V.18 standard.

Letter to IWF and modem manufacturers: **Week of 11/9/98**

Third-Party Gateway Solution
Another proposed data-based solution is a Third Party Gateway Solution, which is a solution, using the Inter-working function (IWF) but it need not be installed in every carrier's network. A third party vendor would supply a number for a TTY user to call into and then complete the call to a landline TTY using the IWF.

The TTY Forum discussed this option at the November 1998 Forum. The Forum and does not consider it to be a viable solution. Thus, the Forum will not pursue development or implementation of this option.

Proprietary Data-based Solutions
To be reviewed at future TTY Forums.

V. Notification to Subscribers and Potential Subscribers who use TTYs

In compliance with the FCC's rules, wireless carriers have notified subscribers and potential subscribers that they may not be able to use TTYs to access 9-1-1 over digital wireless systems. Wireless carriers, with the support of the wireless trade associations, the consumer advocacy groups, TTY manufacturers and wireless handset manufacturers, will continue to notify subscribers and potential subscribers at appropriate intervals until a product is commercially available.

Goals and Target Date
On-going until product is commercially available.

APPENDIX C

SOLUTIONS MATRIX AND WORKPLAN

Task Force Members to Complete the Data Base Solutions Matrix:

- Todd Lantor
- Norm Williams
- Judy Harkins
- Ron Schultz
- Nikolai Leung
- Mohamed El-Rayes
- UWCC member
- Steve Coston
- John Suprock
- Brye Bonner

Group is empowered to complete matrix below on behalf of the TTY Forum.

PROPOSED VOICE-BASED SOLUTIONS
(Passing Baudot signal through the VOCODER)

Proposed Solution	Testing/ Implementation	Advantages/ Disadvantages	Consumer Requirements Supported	Milestones
Direct Audio Connection (2.5 mm Jack – Preferred Method)	1. Finalize Technical Information Document, 2. SRD, 3. Develop Standard, SDO 4. Notify TTY Phone Manufacturers	Advantages: • Cost effective • Small in size • Rapid to implement • High Immunity to interference • Recognized industry connector • Does not require additional power supply • May allow connection to other devices Disadvantages: • Requires modification/ adapter to TTY • Yields no inherent improvement to CER • Supports only limited features	1. Preferred over acoustic 2. Supported 3. Supported 4. Supported 5. TBD 6. Supported 7. Supported 8. Supported 9. Supported 10. N/A 11. N/A 12. N/A 13. N/A	1. Nov 1998 2. Submit to TR45– Dec 1998 3. Ericsson to identify timetable with TR45actual date to be posted on listserve 4. TBD by #3

Proposed Solution	Testing/ Implementation	Advantages/ Disadvantages	Consumer Requirements Supported	Milestones
RJ11-type Modular Connection/ Jack (Analog Solution)	1. Develop Technical Information Document, 2. SRD, 3. Develop Standard 4. Notify TTY Phone Manufacturers	Advantages: • Could support full functionality • Could support some of the embedded base of TTYs Disadvantages: • Physical size • Cannot use handset for VCO functions (may require separate device for HCO/VCO)	1. Preferred over acoustic 2. Supported 3. Supported 4. Supported 5. TBD 6. Supported 7. Supported 8. Supported 9. Supported 10. N/A 11. N/A 12. N/A 13. N/A	This option is not considered a short-term solution by the Forum and therefore is not being pursued by this Forum at this time.

Proposed Solution	Testing/ Implementation	Advantages/ Disadvantages	Consumer Requirements Supported	Milestones
Acoustic solution – use of external landline handset	1. No Standardiza -tion required	Advantages: • No standardizat ion required • Supports most embedded base of TTYs • Very Low interface cost • Short developmen t cycle • Easily accessible to standardize d landline handsets Disadvantages: • Highly susceptible to background noise • Bulky – requires a landline handset and cable	1. Could negatively impact CER 2. Supported 3. Supported 4. Supported 5. TBD 6. Supported 7. Supported 8. Supported 9. Supported 10. N/A 11. N/A 12. N/A 13. N/A	TBD by manufacturer
Proprietary • Phone Products • Terminal s	Unknown	Unknown	Unknown	Unknown FCC can meet with stakeholders

Proposed Solution	Testing/ Implementation	Advantages/ Disadvantages	Consumer Requirements Supported	Milestones
True RJ-11 Connection	1. Develop Technical Information Document, 2. SRD, 3. Develop Standard 4. Notify TTY Phone Manufacturers	Advantages: • Supports full functionality • Support some of the embedded base of TTYs Disadvantages: • Physical size • Cannot use handset for VCO functions (may require separate device for HCO/VCO) • Requires additional power supply • Expensive • Bulky	1. Preferred over acoustic 2. Supported 3. Supported 4. Not Supported 5. TBD 6. Supported 7. Supported 8. Supported 9. Supported 10. N/A 11. N/A 12. N/A 13. N/A	This option is not considered a short-term solution by the Forum and therefore is not being pursued by this Forum at this time.

Proposed Solution	Testing/ Implementation	Advantages/ Disadvantages	Consumer Requirements Supported	Milestones
Vocoder Modifications		Not cost effective No modification to TTY Using Full rate Extensive international standards development and implementa-tion process. Could provide more reliable CER Potential to degrade voice quality. Error detection and correction would be lower for a data tone call compared to data services.	1. TBD 2. Supported 3. Supported 4. Supported 5. TBD 6. Supported 7. Supported 8. Supported 9. TBD 10. Supported 11. Supported 12. TBD 13. TBD	• Develop new standard. • Test new standard for Baudot and voice.

PROPOSED DATA-BASED SOLUTIONS – Circuit-Switched

Proposed Solution	Testing/ Implementation	Advantages/ Disadvantages	Consumer Requirements Supported	Milestones
Inter-Working Function (IWF): • V.18 (Baudot) • Proprietary TTY Modem	• Complete Data SRD • CDMA existing IS-707 • TDMA existing IS-135 • Standards Modifications TBD based on SRD. • Test with existing TTYs for both inbound and outbound calls. • Test with PSAP, existing TTY using existing standards	Advantages: • Reliable Communications, as good as wireline. • World-wide Standard • Requires little or no modifications to existing TTY • Could support more platforms, TTYs, PDAs, and Laptops. Disadvantages: • Not all Carriers may choose to implement data services. • Compatible with all current Baudot standards, except Ultratec's Turbocode. • Require mobile connection interface to existing TTYs. • IWF do not support VCO • IWF with Baudot not commercially available	1. Supported 2. TBD 3. TBD 4. N/A 5. TBD 6. Supported 7. Supported 8. Supported 9. Not Supported 10. Supported 11. TBD 12. Supported 13. Supported	• Est. Timetable 12-18 months • Implement Baudot/V.18 in the IWF • Widespread deployment of the IWF • Update handsets to support data service.

Proposed Solution	Testing/ Implementation	Advantages/ Disadvantages	Consumer Requirements Supported	Milestones
3rd Party Gateway		Advantages: • Landlines TTY do not need to be modified. Disadvantages • Expensive to operate and maintain.	1. TBD 2. Not Supported 3. Not Supported 4. Supported 5. TBD 6. Supported 7. Supported 8. Supported 9. TBD 10. N/A 11. Not Supported 12. Supported 13. TBD	This option is not considered a viable solution by the Forum and therefore is not being pursued by this Forum at this time.
Proprietary	Unknown	Unknown	Unknown	Unknown FCC can meet with stakeholders

*V.18 Letter to modem manufacturers will be drafted by Dick Brandt under the TTY Forum letterhead requesting support for TTY issue.

STANDARD TEST PROCEDURE

In order to meet the requirements of the FCC's October 30, 1998, deadline, the TTY Forum with the assistance of the wireless digital technology groups[1] developed and are finalizing a uniform test methodology ("Test Procedure") to compare character error rates technology by technology (CDMA, TDMA, GSM 1900, iDEN). The TTY Forum has developed four (4) separate documents that are specific to these individual technologies addressed, yet are equivalent in methodology and procedural guidelines necessary to record comparable test results within each technology. These documents are considered "living" documents and are subject to modifications upon initiating the Test Plan (s) described.

While the intent of these documents are to provide uniform test guidelines whereby achieving comparable test results for all technologies, the TTY Forum clearly understands that there are differences within each technology. Therefore, all proposals for change will be reviewed to ensure that the documents do not lose the intended "standardization" between technologies for which they were developed. The Test Procedure documents for the digital wireless technologies CDMA, TDMA, iDEN, and GSM 1900 have been filed in the FCC's E9-1-1 Docket, CC Docket 94-102.

Below is a list of testing facilities, recommended dates, as provided by each wireless digital technology group.

GSMNA
Ericsson Facility
Cetecom Facility
Nokia Type Approval Center

GSM NA plans to commence testing as soon as possible with a target date of January 1999 to provide test results to the TTY Forum and the FCC, provided that the following are true: 1) the test specification with modifications suggested by the GSM NA is approved and released by October 30, 1998; 2) lab based testing with real world conditions is accepted; 3) the test specification does not change dramatically; 4) manufacturers can assist the test facilities to set up the test; and 5) no unforeseen restrictions are placed on the testing.

[1] For purposes of the Workplan, wireless digital technology groups means the CDMA Development Group ("CDG"), GSM North America, and Universal Wireless Communications Consortium ("UWC Consortium").

CDG
Sprint PCS Test Facility
Sprint PCS has commenced testing and is nearly complete with their testing activities. They have used Samsung handsets in their tests.

Bell Atlantic Mobile Test Facility
Bell Atlantic Mobile will test the following handsets: Audiovox, LGIC, Motorola, Nokia, QUALCOMM, and Sony.
Initial tests to be completed by mid-December with all tests completed by late December 1998.

UWCC
AT&T Wireless Services has offered its test facilities for TDMA tests. They anticipate testing to commence in early January 1999, if not sooner.

iDEN
Motorola Test System Facility in Plantation, Florida
Testing to commence: December 15, 1998*

*Date is subject to change. Motorola will attempt to move the date earlier, if possible.

Revised
11/9/98